

REMARKS

This application has been carefully reviewed in light of the Office Action of February 14, 2006, wherein:

1. Claims 1-3 were rejected under 35 U.S.C. §102(e) as being anticipated by Murti et al., hereafter "Murti" (U.S. Publication No. US 2003/0228718 A1);
2. Claims 4-5, 8-9, 11-15, and 19-20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Murti et al. (U.S. Publication No. US 2003/0228718 A1);
3. Claims 13-15 and 19-20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Murti et al. (U.S. Publication No. US 2003/0228718 A1);
4. Claims 6-7, 10, and 16-18 were objected to, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Priority Claim

The Examiner stated in section 1 of the office action that the present application "claims benefit of 60/463,064 filed on April 15, 2004." The Applicant notes that the correct priority date is April 15, 2003, not April 15, 2004.

Claim Rejections: §102(e)

1. The Examiner rejected Claims 1-3 under 35 U.S.C. §102(e) as being anticipated by Murti et al., hereafter "Murti" (U.S. Publication No. US 2003/0228718 A1).

A. Claims 1 and 3

Regarding Claims 1 and 3, the Examiner states that "Murti discloses a apparatus and a method of fabricating a field effect transistor comprising:

depositing a dielectric layer 14 on a substrate 16;

placing a polymer composite over at least a portion of the dielectric layer 14 to form drain 20 and source contacts 22, the polymer composite having a conducting filler [paragraph [0050]]; and

forming an organic semiconductor layer 12 over at least a portion of the polymer composite, the organic semiconductor layer 12 providing a channel between the drain 20 and source contacts 22 [Fig. 1 and paragraph [0044]].”

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

The Applicant respectfully submits that Murti fails to disclose the method of “placing a polymer composite over at least a portion of the dielectric layer 14 to form drain 20 and source contacts 22, the polymer composite having a conducting filler.” Paragraph [0050] of Murti states that the drain and source contact layers “can be fabricated from materials which provide a low resistance ohmic contact to the semiconductor layer. Typical materials suitable for use as source and drain electrodes include those of the gate electrode materials such as gold, nickel, aluminum, platinum, conducting polymers and conducting inks.” While Murti does disclose materials to be used in preparation of the drain and source contacts, Murti fails to disclose the method of preparing the drain and source contacts. Instead, Murti discloses in paragraph [0050] only the methods of preparing the gate electrode layers, which have different requirements for preparation than drain and source contacts that are eventually coated with an organic semiconductor layer. As emphasized in the specification of the present application at paragraph [39], one element of the novelty of the present invention is that the polymer composite used to form the drain and source contacts may be deposited in an atmosphere and not in a vacuum, as is required for sputtering and vacuum deposition techniques. Murti makes no reference to the deposition of the drain and source contacts using such a technique. Murti instead discloses, in paragraph [0059], an example of a thin-film transistor of the present invention where “[s]ource and drain electrodes were deposited by vacuum evaporation of gold....”

In contrast, the present application discloses a fully solution-based processing method that includes placement of a polymer composite over a portion of the dielectric layers to form drain and source contacts, with the polymer composite having a conducting filler. The method also includes the placement of a solution-processed semiconductor on top of the polymer composite. One skilled in the art would expect the top semiconductor solution to dissolve or degrade at least a portion of the underlying polymer composite electrodes.

However, by choosing a particular polymer composite electrode material and using a particular solvent for the semiconductor solution (to deposit the semiconductor film), these contacts do not dissolve and in fact exhibit good ohmic performance. Murti is limited to the disclosure and application of a solution-based processing method directed only to the semiconductor layer, and fails to disclose a fully solution-based processing method that includes the application of a polymer composite.

Therefore, as Murti fails to disclose the act of placing a polymer composite with a conducting filler over a portion of the dielectric layer to form drain and source contacts, the Applicant contends that Murti does not anticipate each and every element of Claims 1 and 3. The Applicant respectfully requests that the rejections of Claim 1 and 3 be withdrawn.

B. Claim 2

The Examiner further rejected Claim 2, stating that Murti discloses the act of forming an organic semiconductor layer by dissolving an organic semiconductor in a solvent forming a semiconductor solution; depositing the semiconductor solution over at least a portion of the polymer composite; and evaporating the solvent from the semiconductor solution such that the organic semiconductor layer remains [paragraph [0002]].

The Applicant refers the Examiner to the arguments presented in section A. (above) with regard to the novelty of placing a polymer composite with a conducting filler over a portion of the dielectric layer to form drain and source contacts, which the Applicant regards as a novel feature of the present invention. As the Applicant believes that Claim 1 is in allowable condition, the Applicant submits that Claim 2, which depends from Claim 1, is also in allowable condition. Therefore, the Applicant respectfully requests that the rejection of Claim 2 be withdrawn.

Claim Rejections: §103(a)

2. The Examiner rejected Claims 4-5, 8-9 and 11-12 under 35 U.S.C. §103(a) as being unpatentable over Murti et al., hereafter "Murti" (U.S. Publication No. US 2003/0228718 A1).

C. Claims 4 and 12

The Examiner rejected Claims 4 and 12 under 35 USC § 103(a) as being unpatentable over Murti, stating that “Murti discloses a method of fabricating a field effect transistor comprising:

- forming a first contact pattern 18 on a substrate 16;
- depositing a dielectric layer 14 on the substrate 16;
- depositing a polymer composite having a conducting filler to form a second contact pattern connected with the dielectric layer 14; and
- providing an organic semiconductor layer 12 for connecting a first portion 20 of the second contact pattern with a second portion 22 of the second contact pattern [Fig. 1 and paragraph [0044]].”

The Applicant submits that Murti does not disclose an apparatus and method of fabricating a field effect transistor comprising the act of depositing a polymer composite having a conducting filler to form a second contact pattern connected with the dielectric layer. Specifically, Murti does not disclose the specific act of depositing a polymer composite having a conducting filler to form a second contact pattern. Murti only discloses the act of forming a first contact pattern (the gate electrode) [paragraph [0050]], which has significantly different properties and materials requirements than forming the second contact pattern using a fully solution-based process. The formation of the polymer composite-based second contact pattern must be compatible with the application of an organic semiconductor layer to prevent dissolution of the polymer composite. Murti describes the formation of the second contact pattern in paragraph [0059] using the traditional process of vacuum evaporation. Therefore, Murti fails to disclose, teach, or suggest the elements of Claims 4 and 12. The Applicant respectfully requests that the rejections of Claim 4 and 12 be withdrawn.

D. Claim 5

With regard to the rejection of Claim 5, the Applicant refers the Examiner to the arguments presented in section C. with regard to Claim 4. As Claim 5 is dependent on Claim 4, which the Applicant believes is in allowable condition, the Applicant also believes Claim 5 is allowable. For at least these reasons, the Applicant respectfully requests that the rejection of Claim 5 be withdrawn.

E. Claim 8

With regard to the rejection of Claim 8, the Applicant refers the Examiner to the arguments presented in section C. with regard to Claim 4. As the Applicant believes Claim 4 to be in allowable condition, Claim 8, which is dependent upon Claim 4, should also be in allowable condition. For at least these reasons, the Applicant respectfully requests that the rejection of Claim 8 be withdrawn.

F. Claim 9

With regard to the rejection of Claim 9, the Applicant refers the Examiner to the arguments presented in section C. with regard to Claim 4. As the Applicant believes Claim 4 to be in allowable condition, Claim 9, which is dependent upon Claim 9, which is dependent upon Claim 4, should also be in allowable condition. For at least these reasons, the Applicant respectfully requests that the rejection of Claim 9 be withdrawn.

G. Claim 11

With regard to the rejection of Claim 11, the Applicant refers the Examiner to the arguments presented in section C. with regard to Claim 4. As the Applicant believes Claim 4 to be in allowable condition, Claim 11, which is dependent upon Claim 4, should also be in allowable condition.

Additionally, as previously discussed in section A., Murti fails to disclose the use of a polymer composite to form the drain and source contacts. As such, Murti also does not disclose the order of depositing the polymer composite and organic semiconductor layers as discussed in Claim 11.

For at least these reasons, the Applicant respectfully requests that the rejection of Claim 11 be withdrawn.

3. The Examiner rejected Claims 13-15 and 19-20 under 35 U.S.C. §103(a) as being unpatentable over Murti et al., hereafter "Murti" (U.S. Publication No. US 2003/0228718 A1).

H. Claim 13

The Examiner states that Murti discloses a field effect transistor comprising:
a substrate 16 including a first contact pattern 18;
a dielectric layer 14 disposed on the substrate 16;
a polymer composite connected with the dielectric layer 14, the polymer composite providing a second contact pattern, the second contact pattern having a first portion 20 and a second portion 22, where the first portion 20 and the second portion 22 are separated by a distance; and

an organic semiconductor layer 12 connected with the dielectric layer 14, the organic semiconductor layer 12 allowing for an electrical connection between the first portion 20 and the second portion 22 of the second contact pattern [Fig. 1 and paragraph [0044]].

The Applicant asserts, as mentioned previously in sections A. and C. above, that Murti does not disclose the use of a polymer composite to provide a second contact pattern. Although Murti lists “conducting polymers and conducting inks” in the list of suitable materials for use as drain and source electrodes, Murti provides no information on the process of applying a polymer composite that would enable one of ordinary skill in the art to make a flexible ohmic contact without undue experimentation. As a result, Murti fails to meet the enablement requirement as set forth in 35 U.S.C. §112. The Applicant refers the Examiner to the declaration by inventor Erik J. Brandon (Appendix A), which discusses the failure of Murti to meet the enablement requirement with regard to the disclosure of a fully solution-processed organic semiconductor.

As Murti fails to fully disclose an enabling embodiment using a polymer composite as a second contact pattern, the Applicant requests that the rejection of Claim 13 be withdrawn.

I. Claim 14

With regard to Claim 14, the Applicant refers the Examiner to the arguments presented in section H. above. As the Applicant believes Claim 13 is in allowable condition, Claim 14, which is dependent upon Claim 13, is also in allowable condition. For at least these reasons, the Applicant respectfully requests that the rejection of Claim 14 be withdrawn.

J. Claim 15

With regard to Claim 15, the Applicant refers the Examiner to the arguments presented in section H. above. As the Applicant believes Claim 13 is in allowable condition, Claim 15, which is dependent upon Claim 13, is also in allowable condition. The Applicant therefore respectfully requests that the rejection of Claim 15 be withdrawn.

K. Claim 19

With regard to Claim 19, the Applicant refers the Examiner to the arguments presented in section H. above. As the Applicant believes Claim 13 is in allowable condition, Claim 19, which is dependent upon Claim 13, is also in allowable condition. For at least these reasons, the Applicant respectfully requests that the rejection of Claim 19 be withdrawn.

L. Claim 20

With regard to Claim 20, the Applicant refers the Examiner to the arguments presented in section H. above. As the Applicant believes Claim 13 is in allowable condition, Claim 20, which is dependent upon Claim 13, is also in allowable condition.

Additionally, as discussed previously in section H., Murti does not disclose the use of a polymer composite formed with an organic semiconductor layer in a fully solution-based process, as is disclosed and claimed in the Claim 20.

For at least these reasons, the Applicant respectfully requests that the rejection of Claim 20 be withdrawn.

Claim Objections & Allowable Subject Matter

4. Claims 6-7, 10, and 16-18 were objected to, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

M. Claims 6-7, 10, and 16-18

The Examiner objected to Claims 6-7, 10, and 16-18 as being dependent upon a rejected base claim, but indicated that they would be allowable if rewritten in independent form to include all limitations of the base claim and any intervening claims.

The Applicant appreciates the indication of allowable subject matter, but as the Applicant believes the underlying base claims are allowable, the Applicant respectfully requests reconsideration of the rejections of the base claims and allowance of all pending claims in the present application.

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Concluding Remarks:

The Applicant respectfully submits that in light of the above comments and remarks, all claims are in allowable condition. The Applicant thus respectfully requests timely
10 allowance of all of the pending claims.

In the event the Examiner wishes to discuss any aspect of this response, or believes that a conversation with either Applicant or Applicant's representative would be beneficial the Examiner is encouraged to contact the undersigned at the telephone number indicated
15 below.

The Commissioner is authorized to charge any additional fees which may be required or credit overpayment to the attached credit card form. In particular, if this response is not timely filed, the Commissioner is authorized to treat this response as including a petition
20 to extend the time period pursuant to 37 CFR 1.136(a) requesting an extension of time of the number of months necessary to make this response timely filed. The petition fee due in connection therewith may be charged to deposit account no. 50-2691 if a credit card form has not been included with this correspondence or if the credit card could not be charged.

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Respectfully submitted,



Scott Davison

Registration No. 52,800

Tel.: (310) 804-1737

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Attachments (Appendix A)

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